

*the*

# hot zone

*Solar Manufacturing's Quarterly Newsletter*

## Solar Manufacturing Takes Multipurpose "Mentor" Vacuum Furnace to FNA 2014 in Nashville

Approximately one year ago, William R. Jones, CEO of the Solar Atmospheres Group of Companies, donated a small horizontal vacuum furnace for use as a teaching tool at the ASM International training facility in Materials Park, Ohio. This furnace was given the name "The Mentor" as it would serve to teach and guide students seeking to advance in the metals processing world.

As the first Mentor was being engineered and manufactured, a second unit was built for the Solar Atmospheres plant in Hermitage, Pennsylvania. This furnace proved very useful testing various materials and economically processing smaller production loads. Because of the usefulness of this compact furnace in handling many different needs, Solar Manufacturing elected to offer it to the general marketplace. Several companies realized that such a unit could be a very useful piece of equipment and to date, seven Mentor furnaces have been sold.

In early October, Solar Manufacturing will be taking one of these multipurpose vacuum furnaces to Furnaces North America (FNA 2014) in Nashville where both captive and commercial heat treaters can take a closer look.

The furnace is a Solar Manufacturing Horizontal Model HFL-2018-2IQ with a work zone that measures 12" wide by 12" high by 18" deep with a maximum operating temperature of 3000°F and a temperature uniformity of  $\pm 10^\circ\text{F}$  between 800°F and 2400°F.

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# U.S. Patent Office Publishes Solar Manufacturing Patent Application

The management of Solar Manufacturing Inc. and affiliate company Solar Atmospheres Inc., announced recently that Solar Manufacturing inventors, Robert J. Wilson and Robert F. Daley were notified by the US Patent and Trademark Office that their Patent Application, Publication No. US2014/0042678 A1, for a new 20 Bar Super Quench Vacuum Furnace was published on February 13, 2014 and is now available to the public on the USPTO.gov website.

The published patent application, a first step in the patent process, contains 19 claims which detail the unique design of a horizontal, single chamber, front loading vacuum heat treating furnace capable of in-situ gas quenching at pressures up to 20 bar and with cooling gas speeds reaching up to 200 mph.

One major advantage of the new design is the use of movable radiation baffle doors that prevent heat loss during heat cycles and open wide to avoid pressure drops during cooling cycles. The application of the open doors in combination with the use of a plenum fan arrangement, generous annular space for uniform gas flow, and a low static pressure loss nozzle design provide inert gas quenching capabilities typically achieved only with oil quenching by concentrating the available system

horsepower on the task of producing a high nozzle exit velocity. The system also permits excellent cooling at lower pressures. Low pressure cooling is typically sacrificed by undersized fans typically selected in high pressure quench systems. The new system operates in a constant horsepower mode over a large range of quenching pressures.

Commercially, Solar Manufacturing's first 20 bar high pressure quench vacuum heat treating furnace is currently in production at Solar Atmospheres of Western Pennsylvania. The cooling rates are reported to be significantly better than any other high pressure gas quench furnace currently in production.

According to Solar Atmospheres of Western PA President, Bob Hill, the new 20 Bar Super Quench furnace is "the fastest cooling furnace in the Solar fleet and one of only a few of its kind in the U.S. By adding the unique capabilities of the 20 bar quenching to our repertoire, we can now effectively process a wider range of materials and assist more customers than we could with our 10 bar furnaces."

For more information, please contact Peter Reh, Vice President of Sales, at [pk\\_r@solararmfg.com](mailto:pk_r@solararmfg.com) or (267) 384-5040 x1509.



# Electric Power Company Incentives and Rebates

**Vacuum furnaces in everyday operation** use significant amounts of electric power to perform all types of production heat treating and brazing processes. Power companies continually ask vacuum furnace users to reduce electric power consumption on these furnaces, especially during critical peak demand times. Many power companies offer incentives and rebates for new installations demonstrating reduced power consumption.

Solar Manufacturing recently worked on three separate programs to assist customers seeking rebates. Two programs relating to new furnaces and one relating to a hot zone rebuild have yielded substantial rebates from the power company. These rebates helped pay for the initial purchases, more than offsetting the initial additional cost to add the improvements. The design changes also provide an ongoing future reduction in electric power bills, saving money during routine use over and above the one-time rebates.

Some of the areas that became part of the incentive programs included:

- New and improved hot zone insulation configurations and supporting components
- Introduction of variable frequency drives (VFD) on vacuum pumps
- Use of VFDs and synchronous design on furnace gas cooling motors
- Minimizing diffusion pump heater power – Solar ConserVac™ System.
- Controlling pump power requirements on supporting water cooling systems.

If you are planning to purchase a new furnace or a new hot zone, ask your power company if there are incentive or rebate programs that exist and if so, Solar Manufacturing will assist you by providing you with proper information and technical data to support your application. These programs do exist across the country and with our help, a nice financial return could result.

Please contact your Solar Manufacturing representative or Pete Reh, VP of Sales, at 267-384-5040 or [prk@solarmfg.com](mailto:prk@solarmfg.com). Additional information can be found on our website at [solarmfg.com](http://solarmfg.com)

## The Mentor at FNA 2014, *continued from cover*

The hot zone design incorporates a graphite foil hot face backed by four (4) layers of 1/2" high efficiency Rayon graphite felt supported in a stainless steel ring structure. The furnace hearth is capable of supporting loads up to 250 pounds at 2150°F. The vacuum pumping system includes an Alcatel 33 CFM mechanical pump and a Varian VHS-6 diffusion pump for ultimate vacuum in the 10<sup>-6</sup> torr range. The internal gas cooling system is capable of cooling at 2 bar pressure utilizing a 7-1/2 HP motor and a low resistance, straight through, all-copper water-cooled heat exchanger. Full SolarVac® 3000 automated and interactive controls are provided.

Anyone interested in adding this useful new tool to their equipment line should contact Pete Reh, Vice President of Sales, at 267-384-5040 x1509 or [prk@solarmfg.com](mailto:prk@solarmfg.com), or stop by the Solar Manufacturing booth (301-303) at FNA 2014. For more information on Solar Manufacturing visit [solarmfg.com](http://solarmfg.com)

## New Employee Spotlight

Solar Manufacturing's newest employee is Rachel Rittenhouse. A Tennessee native, Rachel is a graduate of Lee University in Cleveland, Tennessee. She will be assisting Purchasing Manager, Sue Harwanko with the many administrative and record-keeping tasks of a busy department. Rachel will also assist occasionally with front desk duties, and greet customers and other visitors when needed.

Solar Manufacturing is happy to welcome Rachel.



## Podcast



Listen at [solarmfg.com/podcast](http://solarmfg.com/podcast)

The latest podcast, released in August, is the first in a two-part series discussing furnace preventive maintenance.

This newsletter is published quarterly by Solar Manufacturing, a leader in world-class vacuum heat treating furnaces.

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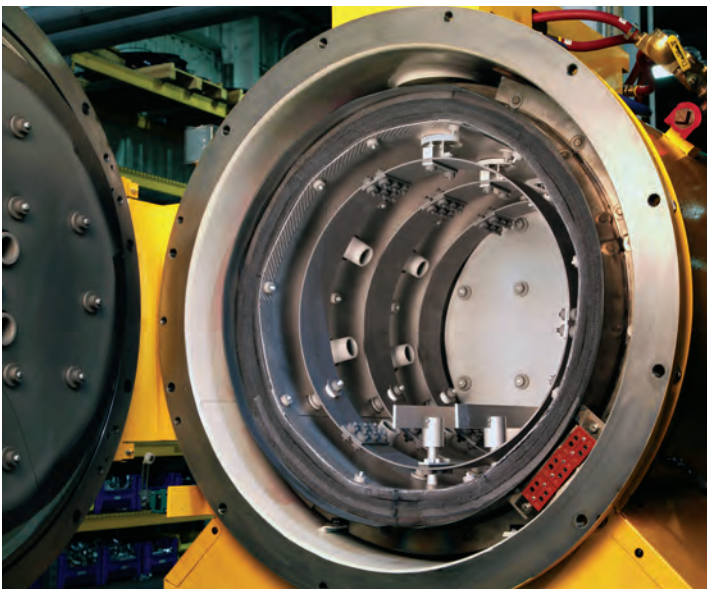
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# THE MENTOR

## Model HFL-2018-2IQ



This is *not* your typical lab vacuum furnace. Compact but by no means short on capability. The Mentor is loaded with standard production furnace features and rugged enough to perform without compromise — just like our production vacuum furnaces. The Mentor's work zone size allows heat treaters the convenience of running smaller workloads economically.

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### Energy Efficient

Graphite felt insulated hot zone rated to 3000°F

### Sized for Production

12" W x 12" H x 18" D  
250 lbs Capacity

### Interactive Control System

SolarVac® 3000 with Allen-Bradley PLC & PanelView

### Internal Gas Quench System

7.5 HP IGE Motor for 2 Bar (15 PSIG)

### Rugged Built-to-Last Industrial Design

All SS Chamber mounted on a single,  
portable platform

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PROUDLY MADE IN THE USA

Come see the new Mentor at Furnaces North America in Nashville, October 6-8 Booth 301-303, or call Solar Manufacturing today at 267-384-5040. You can also visit the Mentor [solarmfg.com/mentor](http://solarmfg.com/mentor)